FlyBy Math™ Alignment to
Utah Mathematics– 5th Grade [2003]
Intended Learning Outcomes, Core Standards and Objectives

Intended Learning Outcomes: By the end of fifth grade students will be able to:

1. Demonstrate a positive learning attitude toward mathematics	
Intended Learning Outcome	***FlyBy Math*™ Activities**
b. Pose mathematical questions about objects, events, and processes.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
2. Become mathematical problem solvers.	
Intended Learning Outcome	***FlyBy Math*™ Activities**
a. Determine the approach, materials, and strategies to be used in setting up a problem.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
b. Model problem situations in a variety of ways.	--Conduct simulation and measurement for several aircraft conflict problems. --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
d. Construct and use concrete, pictorial, symbolic, and graphical models to represent problem situations.	--Conduct simulation and measurement for several aircraft conflict problems. --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
g. Solve problems in both mathematical and everyday contexts.	--Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation.
h. Recognize that there may be multiple ways to solve a problem.	--Conduct simulation and measurement for several aircraft conflict problems. --Use tables, graphs, and equations to solve aircraft conflict problems.
3. Reason mathematically.	
Intended Learning Outcome	***FlyBy Math*™ Activities**
a. Draw logical conclusions and make generalizations.	--Use tables, bar graphs, line graphs, equations, and a Cartesian coordinate system to draw conclusions.
c. Use models, known facts, and relationships to explain reasoning.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

	--Predict outcomes and explain results of mathematical models and experiments.
d. Make precise calculations and check the validity of the results in the context of the problem.	--Use calculations and experimental evidence to predict, describe, and explain several aircraft conflict problems.
e. Make conjectures based on observation and information and test mathematical conjectures and arguments.	--Conduct simulation and measurement for several aircraft conflict problems. --Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation.
g. Analyze mathematical situations by recognizing and using patterns and relationships.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. --Use tables, bar graphs, line graphs, equations, and a Cartesian coordinate system to draw conclusions.
h. Justify answers and solution processes.	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.
4. Communicate mathematically.	
Intended Learning Outcome a. Represent mathematical ideas with objects, pictures, and symbols.	***FlyBy Math™* Activities** --Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.
b. Express mathematical ideas to peers, teachers, and others through oral and written language.	--Predict outcomes and explain results of mathematical models and experiments.
d. Explain mathematical work and justify reasoning and conclusions.	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.
5. Make mathematical connections.	
Intended Learning Outcome b. Recognize the role of mathematics in the classroom, school, and community.	***FlyBy Math™* Activities** --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
c. Explore problems and describe and confirm results using various representations.	--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.

d. Recognize the connections between mathematics and other content areas and apply mathematical thinking and problem solving in those areas.	--Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation.
6. Represent mathematical situations.	
Intended Learning Outcome a. Create and use representations to organize and communicate mathematical ideas.	***FlyBy Math™* Activities** --Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.
b. Represent mathematical concepts using concrete, pictorial, and symbolic models.	--Conduct simulation and measurement for several aircraft conflict problems. --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.

Standard 2 Students will use patterns and relations to represent and analyze mathematical situations using algebraic symbols.	
Objective 1 Recognize, analyze, and use patterns and describe their attributes.	
Objective a. Analyze and make predictions about patterns involving whole numbers, decimals, and fractions using a variety of tools including organized lists, tables, objects, and variables.	***FlyBy Math™* Activities** --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
Objective 2 Represent, solve, and analyze mathematical situations using algebraic symbols.	
Objective e. Use expressions or one-step equations to represent real-world situations.	***FlyBy Math™* Activities** --Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

Standard 3 Students will use spatial reasoning to recognize, describe, and identify geometric shapes and principles.	
Objective 2 Specify locations and describe spatial relationships using coordinate geometry.	
Objective a. Locate points defined by ordered pairs in the first *quadrant.*	***FlyBy Math™* Activities** --Plot points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system to describe the motion of two airplanes.

Standard 4 Students will understand and apply measurement tools and techniques.	
Objective 2 Determine measurements using appropriate tools and formulas.	
Objective	***FlyBy Math™* Activities**
a. Measure length to the nearest 1/8 of an inch and to the nearest centimeter.	--Conduct simulation and measurement for several aircraft conflict problems.
d. Calculate *elapsed time* within a.m. or p.m. time periods.	--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.

Standard 5 Students will collect, analyze, and draw conclusions from data and apply basic concepts of probability.	
Objective 1 Formulate and answer questions using statistical methods to compare data.	
Objective	***FlyBy Math™* Activities**
b. Collect, compare, and display data using an appropriate format (i.e., *line plots*, bar graphs, *pictographs*, circle graphs, line graphs).	--Conduct simulation and measurement for several aircraft conflict problems. --Represent distance, rate, and time data using tables, line plots, bar graphs, and line graphs.
e. Propose and justify inferences based on data.	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.